Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #1 - Sod Release

Scenario Description:

Reduce competition from sod around trees/shrubs within a windbreak/shelterbelt. Apply appropriate herbicides to stress or kill competing sod vegetation between and/or within tree/shrub rows. A herbicide application is completed to significantly reduce competition from sod (grass) in the windbreak.

Before Situation:

1000 feet of livestock shelterbelt, 4 rows of mixed deciduous and conifer trees/shrubs, deteriorating due to being sod bound. Resouce concerns: Degraded plant condition- undesirable plant productivity and health, Livestock Production-Inadequate livestock shelter.

After Situation:

Integrity of windbreak restored. Domestic animal protection restored.

Scenario Feature Measure: Length of Renovation

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000

Scenario Cost: $138.17 **Scenario Cost/Unit:** $0.14

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	1	$38.70
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.04	2	$12.08
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	3	$56.13
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acre	$15.63	2	$31.26

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #2 - Thinning

Scenario Description:

Thinning of selected trees and understory vegetation in a windbreak/shelterbelt is needed to ensure that species composition and stand structure continue to serve their intended purpose. Typical scenario is 1,000 feet. Resource concern is Degraded plant condition-undesirable plant productivity and health.

Before Situation:

1,000' of windbreak/shelterbelt renovation carried out through manipulating species composition, stand structure and stocking by the thinning of selected trees and understory vegetation to restore the stand for it's intended purpose. This manipulation does not include pruning.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000

Scenario Cost: $392.01 **Scenario Cost/Unit:** $0.39

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	$6.55	10	$65.50
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$59.13	2	$118.26
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	10	$187.10
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acre	$42.30	0.5	$21.15

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #3 - Removal, < 8 inches DBH with skidsteer

Scenario Description:

Windbreak renovation requires the removal of degraded or inappropriate trees or shrubs within a windbreak. This may include removal of entire rows, including stumps or roots, or selected trees/shrubs in order to prepare for the planting of a replacement row within the windbreak, improve the health of the remaining rows, and/or allow for supplemental planting to expand the windbreak. Resource concerns include Degraded plant condition- undesirable plant productivity and health, Livestock Production-Inadequate livestock shelter, Soil erosion-wind.

Before Situation:

Reduce wind impacts by renovating 1,000 foot windbreaks or shelterbelts using heavy equipment to remove selected trees with average DBH < 8 Inches. Typically trees and shrubs are cleared by a Skidsteer using a tree shear or saw. All slash material from cutting and pruning is either scattered and crushed, piled and crushed, chipped, or removed from the treatment area.

After Situation:

Integrity and function of windbreak restored.

Scenario Feature Measure: Length of Renovation

Scenario Unit: Linear Feet

Scenario Typical Size: 1,000

Scenario Cost: $961.66 **Scenario Cost/Unit:** $0.96

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$44.93	10	$449.30
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.38	11	$246.18
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	1	$266.18

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #4 - Removal, > 8 inches DBH with dozer

Scenario Description:

Windbreak renovation requires the removal of degraded or inappropriate trees or shrubs within a windbreak. This may include removal of entire rows, including stumps or roots, or selected trees/shrubs in order to prepare for the planting of a replacement row within the windbreak, improve the health of the remaining rows, and/or allow for supplemental planting to expand the windbreak. Resource concerns include Degraded plant condition- undesirable plant productivity and health, Livestock Production-Inadequate livestock shelter, Soil erosion-wind.

Before Situation:

Reduce wind impacts by renovating 1,000 foot windbreaks or shelterbelts using heavy equipment to remove selected trees with average DBH > 8 inches. Typically trees and shrubs are cleared by dozer (D-6 or equivalent) using a brush rake or blade. All slash material from cutting and pruning is either scattered and crushed, piled and crushed, chipped, or removed from the treatment area.

After Situation:

Integrity and function of windbreak restored.

Scenario Feature Measure: Length of Renovation

Scenario Unit: Linear Feet

Scenario Typical Size: 1,000

Scenario Cost: $2,732.81 **Scenario Cost/Unit:** $2.73

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$194.09	10	$1,940.90
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12”, Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$25.79	11	$283.69
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$508.22	1	$508.22

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #5 - Coppicing, < 50% of the windbreak

Scenario Description:

Coppicing of selected trees and understory vegetation in a windbreak/shelterbelt is needed to ensure that species composition and stand structure continue to serve their intended purpose. Resource concern is Degraded plant condition- undesirable plant productivity and health.

Before Situation:

One acre of windbreak/shelterbelt renovation carried out through manipulating species composition, stand structure, and stocking by the cutting of selected trees and understory vegetation for coppicing and by removing or disposing of slash so it does not interfere with the intended purpose of the renovation. This manipulation does not include pruning.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000

Scenario Cost: $920.59 **Scenario Cost/Unit:** $0.92

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$44.93	8	$359.44
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	5	$93.55
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.38	9	$201.42
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	1	$266.18

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #6 - Coppicing, > 50% of the windbreak

Scenario Description:

Coppicing of selected trees and understory vegetation in a windbreak/shelterbelt is needed to ensure that species composition and stand structure continue to serve their intended purpose. Resource concern is Degraded plant condition- undesirable plant productivity and health.

Before Situation:

One acre of windbreak/shelterbelt renovation carried out through manipulating species composition, stand structure, and stocking by the cutting of selected trees and understory vegetation for coppicing and by removing or disposing of slash so it does not interfere with the intended purpose of the renovation. This manipulation does not include pruning.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Linear Foot

Scenario Typical Size: 1,000

Scenario Cost: $1,227.25 **Scenario Cost/Unit:** $1.23

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$44.93	12	$539.16
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.38	13	$290.94
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	7	$130.97
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$266.18	1	$266.18

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #7 - Supplemental Planting, container

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of containerized trees/shrubs will improve the effectiveness and longevity of the windbreak. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition -Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the hand planting of containerized tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $678.08 **Scenario Cost/Unit:** $678.08

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	6	$69.72
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$92.63	3	$277.89
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	7	$130.97
Materials						
Tree, conifer, seedling, containerized, 10 cu. in.	1519	Containerized conifer stock, 10 cubic inches (approx 6" plug), 1.7" x 6"). Includes materials and shipping only.	Each	$0.57	350	$199.50

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #8 - Supplemental Planting, container, wildlife protection

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of containerized trees/shrubs will improve the effectiveness and longevity of the windbreak. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition -Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the hand planting of containerized tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $3,165.76 **Scenario Cost/Unit:** $3,165.76

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	6	$69.72
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	15	$280.65
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$92.63	3	$277.89
Materials						
Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	$1.56	350	$546.00
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	$0.05	350	$17.50
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	$5.07	350	$1,774.50
Tree, conifer, seedling, containerized, 10 cu. in.	1519	Containerized conifer stock, 10 cubic inches (approx 6" plug), 1.7" x 6"). Includes materials and shipping only.	Each	$0.57	350	$199.50

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #9 - Supplemental Plantings, bareroot

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs will improve the effectiveness and longevity of the windbreak. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the hand planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $586.95 **Scenario Cost/Unit:** $586.95

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	6	$69.72
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$92.63	2	$185.26
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	7	$130.97
Materials						
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	200	$138.00
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	150	$63.00

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #10 - Supplemental Plantings, bareroot, wildlife protection

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs will improve the effectiveness and longevity of the windbreak. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the hand planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row, and 15'-20' between rows.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Acre

Scenario Typical Size: 1

Scenario Cost: $3,074.63 **Scenario Cost/Unit:** $3,074.63

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	6	$69.72
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	15	$280.65
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	$92.63	2	$185.26
Materials						
Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	$1.56	350	$546.00
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	200	$138.00
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	$0.05	350	$17.50
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	150	$63.00
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	$5.07	350	$1,774.50

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #11 - Supplemental Plantings, machine

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs will improve the effectiveness and longevity of the windbreak. Trees and shrubs planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row with rows 16 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the machine planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Foot

Scenario Typical Size: 1,000

Scenario Cost: $266.25 **Scenario Cost/Unit:** $0.27

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	1	$38.70
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$24.41	1	$24.41
Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$6.60	1	$6.60
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.38	1	$22.38
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	5.5	$102.91
Materials						
Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.47	66	$31.02
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	33	$22.77
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	40	$3.60
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	33	$13.86

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #12 - Supplemental Plantings, machine, wildlife protection

Scenario Description:

Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs will improve the effectiveness and longevity of the windbreak. Trees and shrubs planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row with rows 16 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the machine planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows.

After Situation:

The integrity and function of the windbreak is restored.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Foot

Scenario Typical Size: 1,000

Scenario Cost: $744.54 **Scenario Cost/Unit:** $0.74

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$24.41	1	$24.41
Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$6.60	1	$6.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	1	$38.70
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.38	1	$22.38
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	7.5	$140.33
Materials						
Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.47	66	$31.02
Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	$1.56	66	$102.96
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	33	$22.77
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	40	$3.60
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	$5.07	66	$334.62
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	33	$13.86
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	$0.05	66	$3.30

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #13 - Supplemental Plantings, machine, supplemental water for establishment

Scenario Description:

Tree planting in an area where supplemental water is needed for successful establishment. Generally these areas would be considered arid or drought stricken, but other factors may contribute to requiring supplemental water. Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs will improve the effectiveness and longevity of the windbreak. Trees and shrubs will be planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row, with rows 16 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the machine planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows. The area generally includes arid or drought conditions that greatly reduce the success of tree survival.

After Situation:

The integrity and function of the windbreak is restored. Greatly improved success rate of the windbreak due to the supplemental water during establishment.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Foot

Scenario Typical Size: 1,000

Scenario Cost: $857.21 **Scenario Cost/Unit:** $0.86

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	2	$77.40
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$24.41	1	$24.41
Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$6.60	1	$6.60
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	11.5	$215.17
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12”, Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.38	1	$22.38
Materials						
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	33	$22.77
Micro Irrigation, drip irrigation system, small scale	2170	An above ground, small scale, micro-irrigation system. Includes miniature emitters, tubes, or applicators placed along a water delivery line. Includes materials and shipping only.	Square Foot	$0.11	4000	$440.00
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	33	$13.86
Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.47	66	$31.02
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	40	$3.60

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #14 - Supplemental Plantings, machine, wildlife protection, supplemental water for establishment

Scenario Description:

Tree planting in an area where supplemental water is needed for successful establishment. Generally these areas would be considered arid or drought stricken, but other factors may contribute to requiring supplemental water. Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs will improve the effectiveness and longevity of the windbreak. Trees and shrubs will be planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row, with rows 16 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter.

Before Situation:

Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows. Planting is achieved through machine planting. The area generally includes arid or drought conditions that greatly reduce the success of tree survival.

After Situation:

The integrity and function of the windbreak is restored. Greatly improved success rate of the windbreak due to the supplemental water during establishment.

Scenario Feature Measure: Area of Renovation

Scenario Unit: Foot

Scenario Typical Size: 1,000

Scenario Cost: $1,335.50 **Scenario Cost/Unit:** $1.34

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$6.60	1	$6.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$24.41	1	$24.41
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	2	$77.40
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$22.38	1	$22.38
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	13.5	$252.59
Materials						
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	33	$13.86
Micro Irrigation, drip irrigation system, small scale	2170	An above ground, small scale, micro-irrigation system. Includes miniature emitters, tubes, or applicators placed along a water delivery line. Includes materials and shipping only.	Square Foot	$0.11	4000	$440.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	40	$3.60
Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	$1.56	66	$102.96
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	$5.07	66	$334.62
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	33	$22.77

Materials

Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.47	66	$31.02
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	$0.05	66	$3.30

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #15 - Hand Planted, bareroot

Scenario Description:

Single 600 foot row of bare root shrubs, conifers, hardwoods, or a combination, for wind protection, wildlife habitat, or snow management. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers based on feet of trees. This practice is typically applied to crop, pasture or range lands. Resource Concerns include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition

After Situation:

Wind velocity suitably reduced to minimize soil erosion or to manage snow deposition. Additional wildlife food and cover provided.

Scenario Feature Measure: Length of tree row

Scenario Unit: Foot

Scenario Typical Size: 600

Scenario Cost: $160.87 **Scenario Cost/Unit:** $0.27

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	1	$38.70
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	2	$23.24
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	3	$56.13
Materials						
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	20	$13.80
Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.47	40	$18.80
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	20	$8.40
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	20	$1.80

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #16 - Hand Planted, potted

Scenario Description:

Single 600 foot row of potted shrubs, conifers, hardwoods, or a combination, for wind protection, wildlife habitat, or snow management. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers based on feet of trees. This practice is typically applied to crop, pasture or range lands. Resource Concerns include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition.

After Situation:

Wind velocity suitably reduced to minimize soil erosion or to manage snow deposition. Additional wildlife food and cover provided.

Scenario Feature Measure: Length of tree row

Scenario Unit: Foot

Scenario Typical Size: 600

Scenario Cost: $437.27 **Scenario Cost/Unit:** $0.73

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	1	$38.70
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	2	$23.24
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	3	$56.13
Materials						
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	20	$1.80
Tree, conifer, seedling or transplant, potted, 1 qt.	1534	Potted conifer tree, 1 quart. Includes materials and shipping only.	Each	$3.05	20	$61.00
Shrub, seedling or transplant, potted, 1/2 to 1 gal.	1526	Potted shrub, 1/2 to 1 gal. Includes materials and shipping only.	Each	$4.81	40	$192.40
Tree, hardwood, seedling or transplant, potted, 1 qt.	1529	Potted hardwood tree, 1 quart. Includes materials and shipping only.	Each	$3.20	20	$64.00

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #17 - Hand Planted, bareroot, supplemental water for establishment

Scenario Description:

Tree planting in an area where supplemental water is needed for successful establishment. Generally these areas would be considered arid or drought stricken, but other factors may contribute to requiring supplemental water. Single 600 foot row of bare root shrubs, conifers, hardwoods, or a combination, for wind protection, wildlife habitat, or snow management. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers based on feet of trees. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition. The area generally includes arid or drought conditions that greatly reduce the success of tree survival.

After Situation:

Wind velocity suitably reduced to minimize soil erosion, or to manage snow deposition. Additional wildlife food and cover. Greatly improved success rate of the windbreak due to the supplemental water during establishment.

Scenario Feature Measure: Length of tree row

Scenario Unit: Foot

Scenario Typical Size: 600

Scenario Cost: $519.70 **Scenario Cost/Unit:** $0.87

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	2	$23.24
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	2	$77.40
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	6	$112.26
Materials						
Shrub, seedling or transplant, bare root, 6-18"	1506	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.47	40	$18.80
Tree, hardwood, seedling or transplant, bare root, 6-18"	1509	Bare root hardwood trees 6-18" tall. Includes materials and shipping only.	Each	$0.69	20	$13.80
Micro Irrigation, drip irrigation system, small scale	2170	An above ground, small scale, micro-irrigation system. Includes miniature emitters, tubes, or applicators placed along a water delivery line. Includes materials and shipping only.	Square Foot	$0.11	2400	$264.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	20	$1.80
Tree, conifer, seedling, bare root, 1-1	1513	Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only.	Each	$0.42	20	$8.40

Practice: 650 - Windbreak/Shelterbelt Renovation

Scenario: #18 - Hand Planted, potted, supplemental water for establishment

Scenario Description:

Tree planting in an area where supplemental water is needed for successful establishment. Generally these areas would be considered arid or drought stricken, but other factors may contribute to requiring supplemental water. Single 600 foot row of potted shrubs, conifers, hardwoods, or a combination, for wind protection, wildlife habitat, or snow management. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers based on feet of trees. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition. The area generally includes arid or drought conditions that greatly reduce the success of tree survival.

After Situation:

Wind velocity suitably reduced to minimize soil erosion, or to manage snow deposition. Additional wildlife food and cover. Greatly improved success rate of the windbreak due to the supplemental water during establishment.

Scenario Feature Measure: Length of tree row

Scenario Unit: Foot

Scenario Typical Size: 600

Scenario Cost: $796.10 **Scenario Cost/Unit:** $1.33

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation						
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$11.62	2	$23.24
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	$38.70	2	$77.40
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$18.71	6	$112.26
Materials						
Micro Irrigation, drip irrigation system, small scale	2170	An above ground, small scale, micro-irrigation system. Includes miniature emitters, tubes, or applicators placed along a water delivery line. Includes materials and shipping only.	Square Foot	$0.11	2400	$264.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.09	20	$1.80
Tree, conifer, seedling or transplant, potted, 1 qt.	1534	Potted conifer tree, 1 quart. Includes materials and shipping only.	Each	$3.05	20	$61.00
Tree, hardwood, seedling or transplant, potted, 1 qt.	1529	Potted hardwood tree, 1 quart. Includes materials and shipping only.	Each	$3.20	20	$64.00
Shrub, seedling or transplant, potted, 1/2 to 1 gal.	1526	Potted shrub, 1/2 to 1 gal. Includes materials and shipping only.	Each	$4.81	40	$192.40